



UNITED STATES PATENT AND TRADEMARK OFFICE

cen

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,063	12/15/2003	Young-Hun Seo	OPP031058US	4273

36872 7590 02/21/2007
THE LAW OFFICES OF ANDREW D. FORTNEY, PH.D., P.C.
401 W FALLBROOK AVE STE 204
FRESNO, CA 93711-5835

EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
----------	--------------

2813

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/736,063

Applicant(s)

SEO, YOUNG-HUN

Examiner

James M. Mitchell

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 16-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 16-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to applicant's amendment filed November 27, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-12, 16-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Kadosh et al. (U.S. 6,383,872).

Kadosh (Fig. 4-8) discloses:

(cl. 1, 16) a method of forming a gate in a semiconductor device, the method comprising: forming a shallow trench isolation structure (34) to define an active region (e.g. area to form gate) in a semiconductor substrate (30); forming a gate oxide layer (32) on the semiconductor substrate; forming on the semiconductor substrate a sacrificial layer (36); selectively etching the sacrificial layer to form a sidewall opening over active region (Col. 7, Lines 1-5) and the STI until the gate oxide is exposed (Fig. 4); forming a polycrystalline silicon layer (40) on an area of the gate oxide layer exposed through the sidewall opening and on the sacrificial layer (Fig. 5); anisotropically etching the polycrystalline silicon layer (Col. 3, Lines 41-44) such that

Art Unit: 2813

sidewall gates remain on side of the sidewall opening (Fig. 6), the sidewall gates having a minimum width; and removing the sacrificial layer (Fig. 7);

(cl. 2, 8) the sacrificial layer comprises a nitride layer (Col. 7, Line 50);

(cl. 4, 9, 10) removing the nitride layer comprises a wet etching process (col. 7, Line 52);.

(cl. 5, 11, 16, 17) wherein anisotropically etching the polycrystalline layer comprises an etch-back process (col. 3-4, Lines 67-2) and therefore over etching sidewall gates to a minimum width;

(cl. 6, 12) wherein a thickness of the sacrificial layer determines/ affects widths of the sidewall gates (Fig. 5-6);

(cl. 7) the width of the sidewall opening corresponds to a distance from one gate to an adjacent gate (Fig. 4, Fig. 6);

(cl. 18, 19) depositing a photoresist layer on the sacrificial layer and patterning the photoresist layer (Col. 1, Lines 38-40; Column 7, Lines 3-5) to form an opening exposing a predetermined area of the sacrificial layer (Fig. 4);

(cl. 20, 21) the opening comprises/ encompasses an area on the substrate from where one sidewall gate will be formed to where an adjacent gate will be formed (Fig. 4, Fig. 6);

(cl. 22) wherein forming the STI defines a plurality of active regions in the substrate (e.g. each device separated by trench; Fig. 6), and etching the sacrificial layer forms an opening over at least two of the active regions and the STI(Fig. 4);

(cl. 23) wherein etching (Col. 7, Lines 1-5) the sacrificial layer exposes the active region and the STI (Fig. 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanafi et al. (U.S. 2002/0197810) in combination with Abeln et al. (U.S. 6,207,510) and Rhodes (U.S. 2004/0094784).

(cl. 1) a method of forming a gate in a semiconductor device, the method comprising: forming an active region (e.g. area to form gate) in a semiconductor substrate ("silicon"; Fig. 5); forming a gate oxide layer ("oxide1"; Fig. 6) on the semiconductor substrate; forming on the semiconductor substrate a sacrificial layer (27); selectively etching the sacrificial layer (e.g. follows process of U.S. 5,866,462) to form a sidewall opening over active region (Fig. 16) until the gate oxide is exposed); forming a polycrystalline silicon layer (28) on an area of the gate oxide layer exposed through the sidewall opening and on the sacrificial layer (Fig. 15); etching the polycrystalline silicon layer (Table 1 of U.S. 5,866,462 incorporated by Hanafi) such that sidewall gates remain on side of the sidewall opening (Fig. 15), the sidewall gates having a minimum width; and removing the sacrificial layer (Fig. 16).

Hanafi does not appear to explicitly disclose the use of STI in its substrate or

Art Unit: 2813

anisotropically etching.

However, Abeln (Fig. 2) utilizes STI in its substrate.

It would have been obvious to one of ordinary skill in the art to incorporate STI in the substrate of Hanafi in order to provide separate active areas as taught by Abeln (20; Fig. 1).

Neither Hanafi nor Abeln appear to disclose the use of anisotropic etching.

However, Rhodes teaches an anisotropic etch (Par. 0010).

It would have been obvious to one of ordinary skill in the art to incorporate the process of using an anisotropic etch on the gate material of Hanafi as a known means to remove/etch excess material as evidenced by Rhodes and as required by Hanafi (28; Fig. 15).

Response to Arguments

Applicant's arguments with respect to his amended claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

Art Unit: 2813

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Application/Control Number: 10/736,063

Page 7

Art Unit: 2813

Ex. Mitchell, J.D.
February 9, 2007

A large, stylized handwritten signature in black ink, likely belonging to J.D. Mitchell, is written over the typed name and date. The signature consists of several loops and a long, sweeping tail.